

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP627A, TLP627A-2, TLP627A-4

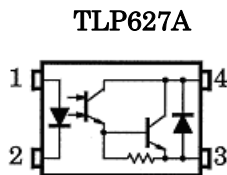
TELECOMMUNICATION
PROGRAMMABLE CONTROLLERS
DC-OUTPUT MODULE

The TOSHIBA TLP627A, -2, and -4 consist of a gallium arsenide infrared emitting diode optically coupled to a darlington connected phototransistor which has a 350V high voltage of collector-emitter breakdown voltage.

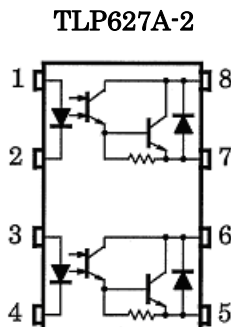
The TLP627A-2 offer two isolated channels in a eight lead plastic DIP package, while the TLP627A-4 provide four isolated channels per package.

- Collector-Emitter Voltage : 350V(MIN)
- Current Transfer Ratio : 1500% (MIN)
- Isolation Voltage : 5000Vrms(MIN)

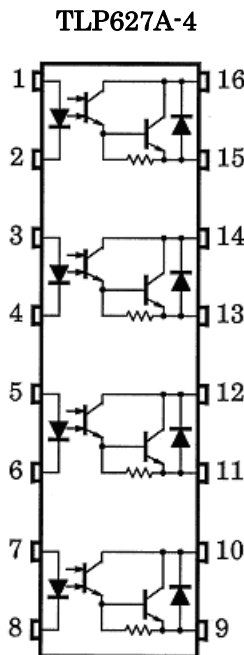
Pin Configuration (top view)



1 : ANODE
2 : CATHODE
3 : EMITTER
4 : COLLECTOR

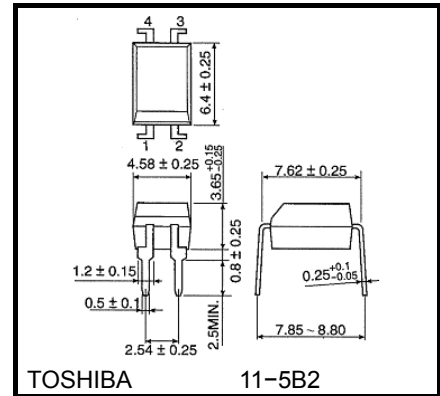


1, 3 : ANODE
2, 4 : CATHODE
5, 7 : EMITTER
6, 8 : COLLECTOR

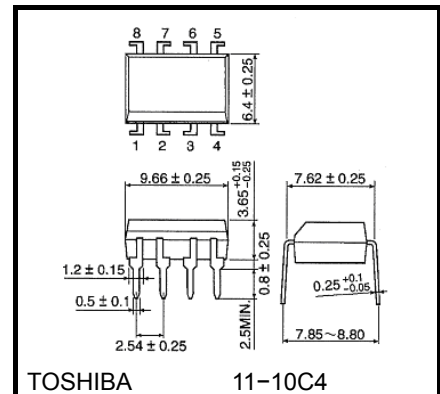


1, 3, 5, 7 : ANODE
2, 4, 6, 8 : CATHODE
9, 11, 13, 15 : EMITTER
10, 12, 14, 16 : COLLECTOR

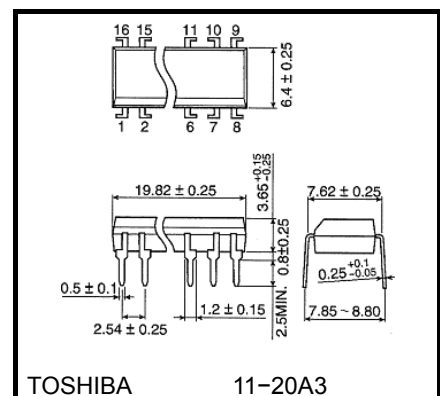
单位: mm



Weight : 0.26 g



Weight : 0.54 g



Weight : 1.1 g

Absolute Maximum Ratings (Ta = 25°C)

| CHARACTERISTICS | | SYMBOL | RATING | | UNIT |
|--|--|-------------------------------|--------------------------------------|------------------------|---------|
| | | | TLP627A | TLP627A-2 TLP627A-4 | |
| LED | Forward Current | I_F | 60 | 50 | mA |
| | Forward Current Derating | $\Delta I_F / ^\circ\text{C}$ | -0.7 (Ta ≥ 39°C) | -0.5 (Ta ≥ 25°C) | mA / °C |
| | Pulse Forward Current | I_{FP} | 1 (100 μs Pulse, 100 pps) | | A |
| | Reverse Voltage | V_R | 5 | | V |
| DETECTOR | Collector-Emitter Voltage | V_{CEO} | 350 | | V |
| | Emitter-Collector Voltage | V_{ECO} | 0.3 | | V |
| | Collector Current | I_C | 150 | | mA |
| | Collector Power Dissipation (1 circuit) | P_C | 150 (300) (*) | 100 | mW |
| | Collector Power Dissipation Derating (Ta ≥ 25°C, 1 Circuit) | $\Delta P_C / ^\circ\text{C}$ | -1.5 (-3.5) (*) | -1.0 | mW / °C |
| | Storage Temperature Range | T_{stg} | -55 ~ 125 | | °C |
| | Operating Temperature Range | T_{opr} | -55 ~ 100 | | °C |
| | Lead Soldering Temperature | T_{sol} | 260 (10 sec) | | °C |
| Total Package Power Dissipation (1 circuit) | | P_T | 250 (320) (*) | 150 | mW |
| Total Package Power Dissipation Derating (Ta ≥ 25°C, 1 circuit) | | $\Delta P_T / ^\circ\text{C}$ | -2.5 (-3.2) (*) | -1.5 | mW / °C |
| Isolation Voltage | | BV_S | 5000 (AC, 1 min, R.H. ≤ 60%) (**) | | Vrms |

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

* : $I_F = 20 \text{ mA max}$

** : Device considered a two terminal device : LED side pins shorted together and DETECTOR side pins shorted together.

Recommended Operating Conditions

| CHARACTERISTICS | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|-----------------------|-----------|------|------|------|------|
| Supply Voltage | V_{CC} | — | — | 200 | V |
| Forward Current | I_F | — | 16 | 25 | mA |
| Collector Current | I_C | — | — | 120 | mA |
| Operating Temperature | T_{opr} | -25 | — | 85 | °C |

Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

Individual Electrical Characteristics (Ta = 25°C)

| CHARACTERISTICS | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|-----------------|-------------------------------------|---------------|--|------|------|------|------|
| LED | Forward Voltage | V_F | $I_F = 10 \text{ mA}$ | 1.0 | 1.15 | 1.3 | V |
| | Reverse Current | I_R | $V_R = 5 \text{ V}$ | — | — | 10 | μA |
| | Capacitance | C_T | $V = 0, f = 1 \text{ MHz}$ | — | 30 | — | pF |
| DETECTOR | Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C = 0.1 \text{ mA}$ | 350 | — | — | V |
| | Emitter-Collector Breakdown Voltage | $V_{(BR)ECO}$ | $I_E = 0.1 \text{ mA}$ | 0.3 | — | — | V |
| | Collector Dark Current | I_{CEO} | $V_{CE} = 300 \text{ V}$ | — | 10 | 200 | nA |
| | | | $V_{CE} = 300 \text{ V}, T_a = 85^\circ\text{C}$ | — | — | 20 | μA |
| | Capacitance Collector to Emitter | C_{CE} | $V = 0, f = 1 \text{ MHz}$ | — | 10 | — | pF |

Coupled Electrical Characteristics (Ta = 25°C)

| CHARACTERISTICS | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|--------------------------------------|--------------------------|--|------|------|------|------|
| Current Transfer Ratio | I_C / I_F | $I_F = 1 \text{ mA}$, $V_{CE} = 1 \text{ V}$ | 1500 | 4000 | — | % |
| Saturated CTR | $I_C / I_F (\text{sat})$ | $I_F = 10 \text{ mA}$, $V_{CE} = 1 \text{ V}$ | 500 | — | — | % |
| Collector-Emitter Saturation Voltage | $V_{CE} (\text{sat})$ | $I_C = 15 \text{ mA}$, $I_F = 1 \text{ mA}$ | — | — | 1.0 | V |
| | | $I_C = 100 \text{ mA}$, $I_F = 10 \text{ mA}$ | 0.3 | — | 1.2 | |

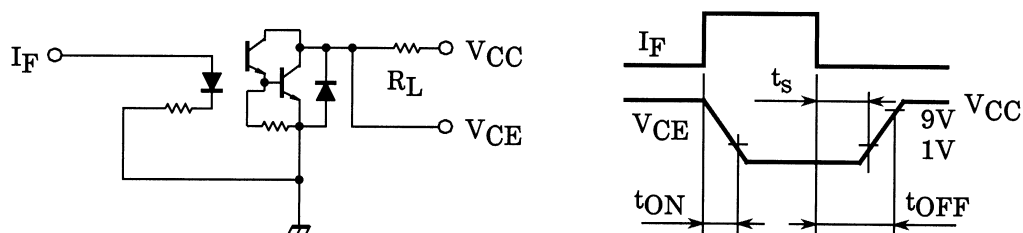
Isolation Characteristics (Ta = 25°C)

| CHARACTERISTICS | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|-----------------------------|--------|--|--------------------|-----------|------|----------|
| Capacitance Input to Output | C_S | $V_S = 0$, $f = 1 \text{ MHz}$ | — | 0.8 | — | pF |
| Isolation Resistance | R_S | $V_S = 500 \text{ V}$, R.H. $\leq 60\%$ | 5×10^{12} | 10^{14} | — | Ω |
| Isolation Voltage | BV_S | AC, 1 minute | 5000 | — | — | Vrms |
| | | AC, 1 second, in oil | — | 10000 | — | |
| | | DC, 1 second, in oil | — | 10000 | — | Vdc |

Switching Characteristics (Ta = 25°C)

| CHARACTERISTICS | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|-----------------|-----------|---|------|------|------|---------------|
| Rise Time | t_r | $V_{CC} = 10 \text{ V}$ $I_C = 10 \text{ mA}$ $R_L = 100 \Omega$ | — | 40 | — | μs |
| Fall Time | t_f | | — | 15 | — | |
| Turn-on Time | t_{on} | | — | 50 | — | |
| Turn-off Time | t_{off} | | — | 15 | — | |
| Turn-on Time | t_{ON} | $R_L = 180 \Omega$ $V_{CC} = 10 \text{ V}$, $I_F = 16 \text{ mA}$ (Fig.1) | — | 5 | — | μs |
| Storage Time | t_s | | — | 40 | — | |
| Turn-off Time | t_{OFF} | | — | 80 | — | |

Fig.1: SWITCHING TIME TEST CIRCUIT



RESTRICTIONS ON PRODUCT USE

20070701-EN

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